Indiana SR-9 Deployment: Traffic Signal Performance Measures Case Study

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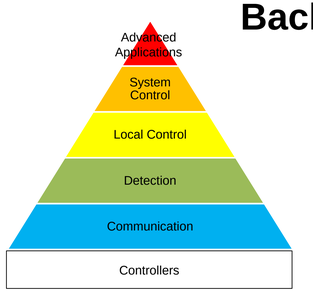
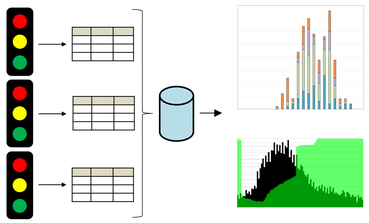
Abstract

As part of ongoing maintenance, INDOT annually identifies several signalized corridors for equipment upgrades and updating of traffic signal timings. The first phase of these efforts is detector maintenance and deployment of upgraded controllers and communication. Traffic signal performance measures collected using the upgraded equipment can then be used to identify signal timing improvements. This poster illustrates the steps followed and outcomes from the traffic signal modernization work on State Road 9 (SR-9) in Anderson, Indiana.

Background



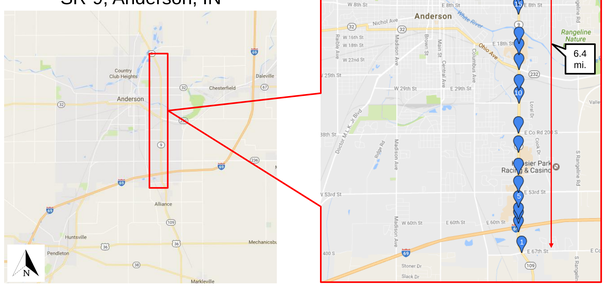
SPM Hierarchy of Needs



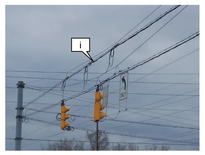
SPM Generation

Study Area

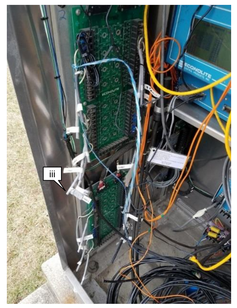
SR-9, Anderson, IN



Modernization Projects



i: new span wires (232)
ii: FYA installed (Mounds Mall)



iii: detector lead-ins cut to prepare for new loops (232)

iv: fiber cut due to issues with handhole (Mounds Mall)

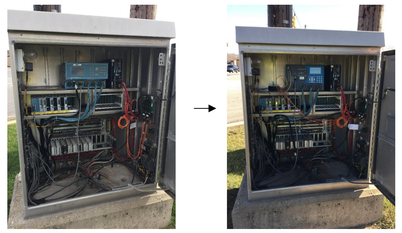
Field Equipment Upgrades

Quantities

ASC3-1000	12
Linux Eagle	3
Eagle Master	1
Microhard Radio	10
EB-6 Radio	1
Yagi Antenna	5
Fiber Switch	10
Non-Fiber Switch	11
Modem	3
Fiber Power	10

Controllers

SR-9 @ 18th St

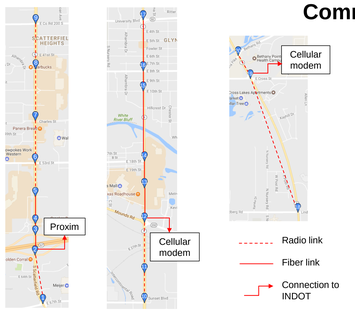


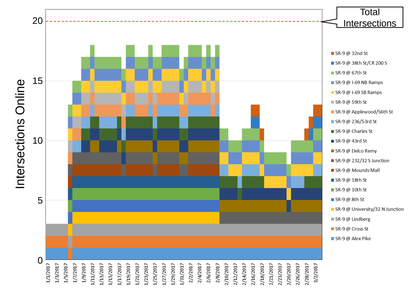
Detector Mapping

SR-9 @ 18th St

Labels on Detector Racks

Communication

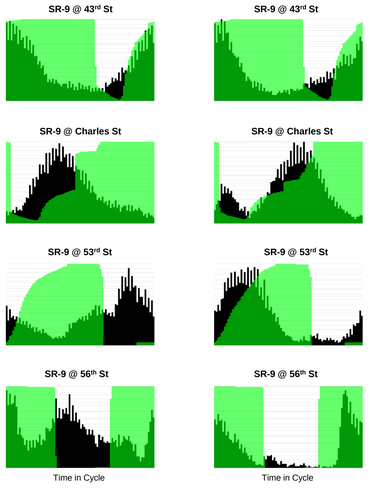




Sample Progression Optimization

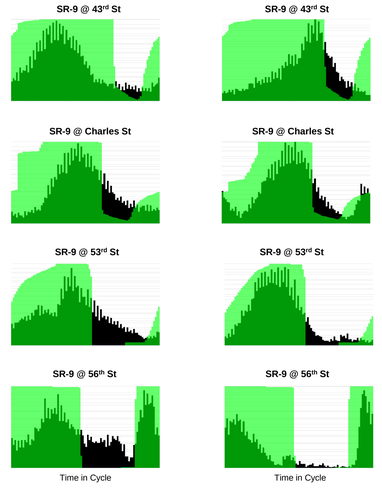
Existing Flow Profiles:

2/6/17-2/20/17
6:00 – 9:00



Optimized Flow Profiles:

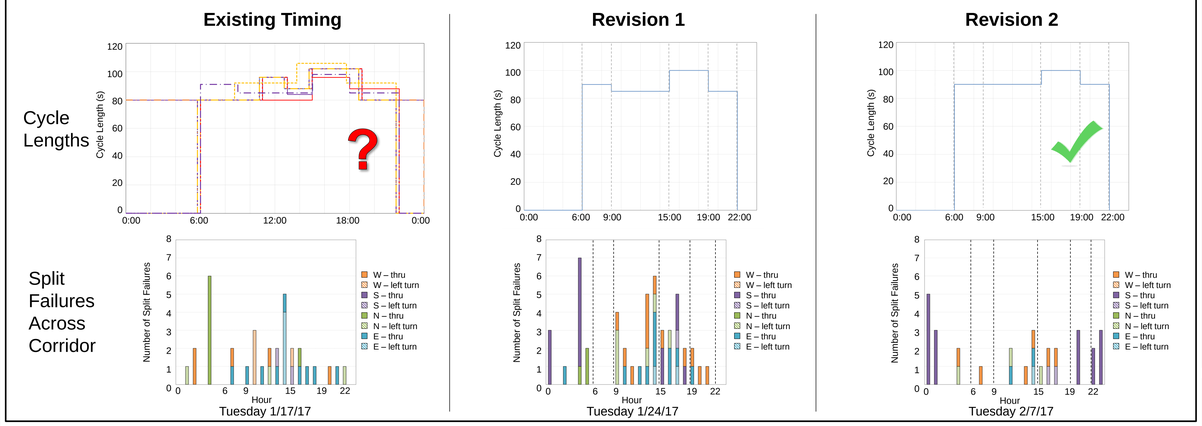
2/6/17-2/20/17
6:00 – 9:00



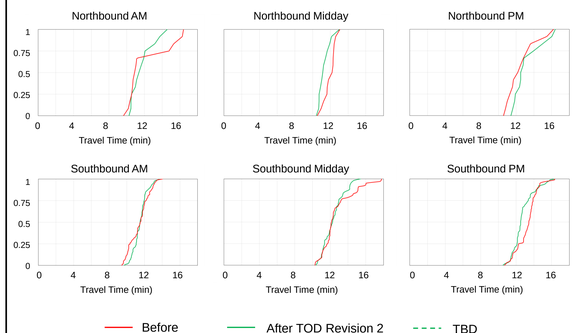
Probability of Green
Vehicle Arrivals

Optimized using Link-Pivot Algorithm; implementation & results TBD.

Time-of-Day Plan Synchronization

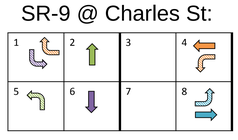


Outcome Assessment

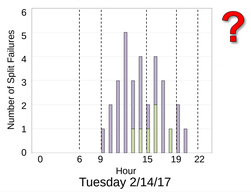


Sample Capacity Analysis

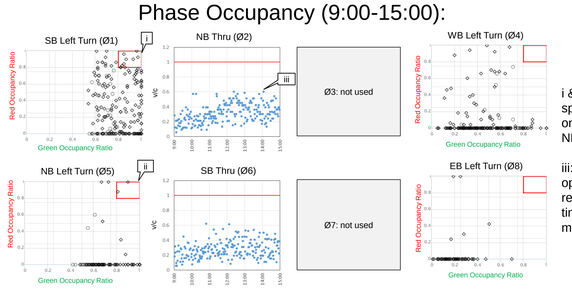
SR-9 @ Charles St:



Existing Split Failures:



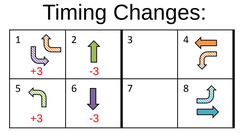
Phase Occupancy (9:00-15:00):



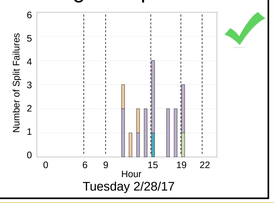
i & ii:
split failures on SB LT & NB LT

iii:
opportunity to redistribute time from mainline thru

Timing Changes:



Change in Split Failures:



Lessons Learned

- Need for centralized detector channel mapping
- Importance of asset management
  - Detector channels & phases changing during modernization projects
- Managing impact of modernization projects
  - Loss of detection, communication
- Identifying milestones for successful implementation
  - Equipment upgrades, communication status
- Differences in high-resolution data implementation between controller vendors